Quantum Mechanics I

PH5400

Instructor: M. Dingfelder
Office: E209
Howell Science Complex
Time: Class: Monday, Wednesday, Friday: 12:00 - 12:50
Problems: TBA
E213 Howell Science Complex
Spring Term 2006

Textbook


Supplemental Literature

There is a big variety of textbooks on Quantum Mechanics. Most of them might be useful for additional information. However, due to slightly different notations and formalisms, some books might look confusing to inexperienced readers. The class will mainly follow Shankar’s book and use his notations. The following list contains some standard text books on Quantum Mechanics as well as some selected, new issues.

- Albert Messiah, Quantum Mechanics, Dover Publishing.
- and others as necessary and appropriate!
Contents and Schedule

- **SCHEDULE IS APPROXIMATE!**
- Dates for material to be covered can change on a day-by-day basis to conform to student interest and class dynamics.

Tentative Schedule and Contents

1. Mathematical introduction.
2. Review of classical mechanics.
3. The postulates - a general discussion.
4. Simple problems in one dimension.
5. The harmonic oscillator.
6. Time independent perturbation theory.
7. The Heisenberg uncertainty relations.
8. Systems with $N$ degrees of freedom.
9 Symmetries and their consequences.
10. Rotational invariance and angular momentum.
11. The hydrogen atom.
12. Spin.

Important dates:

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<thead>
<tr>
<th>Date</th>
<th>Event</th>
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<tbody>
<tr>
<td>tba:</td>
<td>Test I (Chapter 1-4)</td>
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<tr>
<td>tba:</td>
<td>Test II (Chapter 5-10)</td>
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<td>Jan 16:</td>
<td>Martin Luther King Jr Day - no classes</td>
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<td>Jan 25:</td>
<td>Nasa - Houston - no class</td>
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<td>Mar 13-17:</td>
<td>Spring break.</td>
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<td>Apr 14</td>
<td>Good Friday - no classes</td>
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Course Scoring
Scoring will be divided into three categories:

1. Homework. Homework will count 25% of the course grade.
   Each week a sheet with problems will be issued and has to be returned a week later
   (except in weeks with interim tests). Tentatively there will be 10 sheets with an ideal
   score of 10 points each.
2. Interim tests. There will be two tests during the semester. Each test will be weighted
to count 20 % of the course grade, thus the two tests will contribute a total of 40 % of
the course grade.
3. Final Exam. The final exam will count 35 % of the course grade.

Each test, the final exam and all homework sheets together will be designed to yield 100
points for a perfect score.

News and supplemental information
News and additional course information (like the homework sheets and sometimes solu-
tions) will be posted on the web page core.ecu.edu/phys/dingfelderm. Please check the
web page from time to time.

Office Hours
I encourage everybody to stop by my office whenever you have questions or problems.
Don’t hesitate to do so also outside official office hours.